THEREFORE WHAT IS CLAIMED IS:

1. An optical filter device for multiplexing and de-multiplexing multiple wavelengths in optical signals, comprising:

a first waveguide and an optical branching means optically connected to said first waveguide, at least second and third waveguides optically coupled to said optical branching means; and

at least one odd/even select filter optically coupled to said optical branching means for splitting an optical signal launched into said first waveguide into its odd and even wavelength components with one of said odd and even wavelength components being transmitted along one of said at least second and third waveguides and the other of said odd and even wavelength components being transmitted through the other of said at least second and third waveguides.

2. The filter device according to claim 1 or 17 wherein the optical branching means is a fiber optic circulator and said at least one odd/even select filter transmits one of said odd and even components along one of said at least second and third waveguides and reflects the other of said odd and even wavelength components through the other of said at least second and third waveguides.

3. The filter device according to claim 1 or 17 wherein the optical branching means is an optical coupler and said at least one odd/even select filter means is one filter optically coupled to one of said second and third waveguides, and wherein said at least one odd/even select filter transmits one of said odd and even components along one of said at least second and third waveguides and reflects the other of said odd and even wavelength components through the other of said at least second and third waveguides.

4. The filter device according to claim 3 including a fiber optical isolator optically coupled to said first waveguide to prevent reflections from said filter from returning to said first waveguide.

5. The filter device according to claim 1 or 17 wherein the optical branching

means is an optical coupler and said at least one odd/even select filter means includes a first filter means optically coupled to said second waveguide for transmitting one of said odd and even wavelength components along said second waveguide and a second filter means optically coupled to said third waveguide for transmitting the other of said odd and even wavelength components along said third waveguide.

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6. The filter device according to claim 5 including a fiber optical isolator optically coupled to said first waveguide to prevent reflections from said first and second filter means from returning to said first waveguide.

7. The filter device according to claim 1 or 17 wherein the optical branching means is two optical couplers and said at least one odd/even select filter means is a first filter means located in a fourth waveguide optically coupled to said two optical couplers and a second filter means located in a fifth waveguide optically coupled to said two optical couplers in parallel with said first optical fiber, said second waveguide being optically coupled to one of said two optical couplers and said third waveguide being optically coupled to the other of said two optical couplers.

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8. The filter device according to claim 7 wherein said two optical couplers are two fiber optical couplers.

9. The filter device according to claim 1 wherein said optical signal includes n wavelengths, and wherein said filter device is a first three port filter device, including n-1 in total of said three port filter devices optically coupled in a cascaded series, said second and third waveguides of each of said three port filter devices forming an input port for two subsequent filter devices in said filter series, and wherein the second and third waveguides of each of the last three port filter devices in the cascaded series each carry one of said n wavelengths so that $\lambda 1, \lambda 2, \ldots, \lambda n$ are each output from said cascaded series.

10. The filter device according to claim 1 wherein said optical signal includes n wavelengths $\lambda 1, \lambda 2, \ldots, \lambda n$, wherein said second output waveguide is connected to a first thin film wavelength filter array and said third output waveguide is connected to a second thin film wavelength filter array, each thin film wavelength array including having a least n/2 thin film filters with each thin film filter having an output port for output of one of said wavelengths.

11. The device according to claims 1, 2, 3, 4, 5, 6, 7, 8, 9, 10 or 17 wherein the first waveguide and the at least second and third waveguides are optical fibers.

12. The device according to claims 1, 2, 3, 4, 5, 6, 7, 8, 9, 10 or 11 wherein the odd/even select filter means is a chirped Moire Bragg grating whose index modulation has been selectively erased at preselected locations.

13. The device according to claims 1, 2, 3, 4, 5, 6, 7, 8, 9, 10 or 11 wherein the odd/even select filter means is a sampled grating.

14. The device according to claims 1, 2, 3, 4, 5, 6, 7, 8, 9, 10 or 11 wherein the odd/even select filter means is a chirped sampled grating.

15. The device according to claims 1, 2, 3, 4, 5, 6, 7, 8, 9, 10 or 11 wherein the odd/even select filter means are co-located gratings.

16. The device according to claims 1, 2, 3, 4, 5, 6, 7, 8, 9, 10 or 11 wherein the odd/even select filter means are a series of individual gratings.

17. An optical filter device for multiplexing and de-multiplexing an optical signal having multiple wavelengths, comprising:

a first waveguide and an optical branching means optically connected to said first waveguide, at least second and third waveguides optically coupled to said optical branching means; and

at least one odd/even select filter optically coupled to said optical branching means for either

i) splitting an optical signal launched into said first waveguide into its odd

and even wavelength components with one of said odd and even wavelength components being transmitted along one of said at least second and third waveguides and the other of said odd and even wavelength components being transmitted through the other of said at least second and third waveguides; or

ii) combining optical signals launched into said second and third waveguides with said combined optical signals being transmitted along one of said first waveguide.